

14-Decades Calibration in Airborne Detectors for Environmental Science (14DeCADES), Phase I

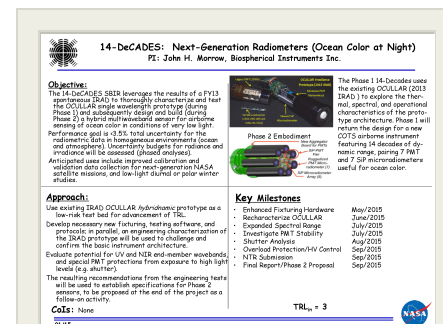
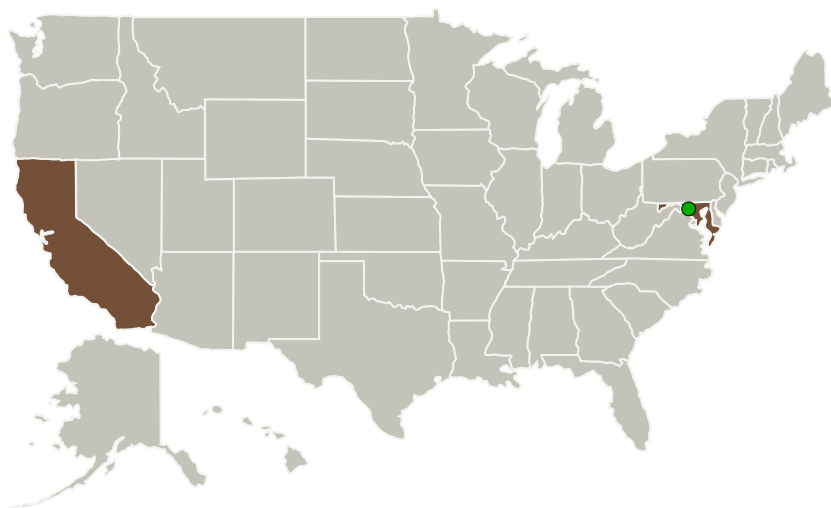
Completed Technology Project (2015 - 2015)



Project Introduction

The 14-DeCADES SBIR leverages the results of a FY13 spontaneous IRAD to characterize and test (Phase 1) and subsequently design and build (Phase 2) a commercial-off-the-shelf (COTS) multiwaveband sensor for airborne sensing of ocean color in conditions of very low light. The new instrument will pair ruggedized, miniature photomultiplier tubes with silicon photodetectors to create so-called hybridnamic detectors for use in both radiance and irradiance radiometers, featuring 14 decades of linear dynamic range. The new radiometers will be suitable for making airborne optical measurements of the atmosphere and ocean in low-light regimes wherein high-quality optical data are rarely available. Anticipated uses include improved calibration and validation data collection for next-generation NASA satellite missions emphasizing turbid atmospheres and waters. Basic research uses include nighttime diurnal or polar winter studies (e.g. aerosol optical depth from shadow band irradiance instruments), and other moon-lit measurements including airborne ocean color missions. Phase 1 will leverage a technology readiness level (TRL) 3 prototype, bringing the work to TRL 4 during six months. If the Phase 2 work is successful, the activity will advance the TRL of the new instrument from a value of 3 (based on the IRAD prototype instrument) to a value of 6 over the period of the SBIR Phase 1 and 2. During Phase 1, necessary new fixturing and testing software and protocols will be developed, and a parallel engineering characterization of the IRAD prototype will confirm the instrument architecture. The resulting recommendations from the engineering tests will be used to establish the specifications for a Phase 2 sensor suite, to be proposed at the end of the project as a follow-on activity.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Biospherical Instruments, Inc.	Lead Organization	Industry	San Diego, California
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations

California	Maryland
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Project Transitions

June 2015: Project Start

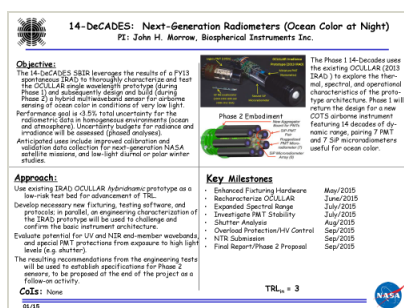
December 2015: Closed out

Closeout Summary: 14-Decades Calibration in Airborne Detectors for Environmental Science (14DeCADES), Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image(<https://techport.nasa.gov/file/138598>)

Images



Briefing Chart Image

14-Decades Calibration in Airborne Detectors for Environmental Science (14DeCADES), Phase I
(<https://techport.nasa.gov/image/131958>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Biospherical Instruments, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

John H Morrow

Co-Investigator:

John C Morrow

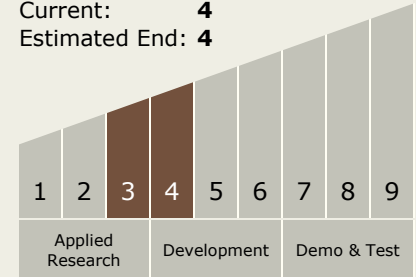
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Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.1 Detectors and Focal Planes

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System